

Editorial Commentary: Anatomy of the Anterolateral Ligament of the Knee—The Science of Looking for Bigfoot



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Abstract: The anterolateral ligament of the knee continues to create a spirited debate within orthopaedics. This can be traced as far back as 1879, when Segond initially described a “pearly, resistant, fibrous band” of the anterolateral aspect of the knee. More recently, much orthopaedic research has been aimed at not only the clinical significance—but defining its very existence. At times, it seems akin to a modern-day search for Bigfoot—some see it, some do not. The authors of this commentary are becoming less skeptical of the anterolateral ligament’s existence but remain in search of its surgical significance.

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De Lima, Helito, de Lima, Silva, Cavalcante, and Leite¹ set out with an ambitious goal in their article “Anatomy of the Anterolateral Ligament of the Knee: A Systematic Review.” They sought to resolve a question that has lingered in modern orthopaedics since at least 2012. Does the anterolateral ligament (ALL) really exist? This question has had some urgency as we strive to improve the results of our anterior cruciate ligament (ACL) reconstruction surgical procedures and solve the clinical problem of rotatory instability of the knee. The limitations of ACL reconstruction are well known.

ACL reconstruction techniques currently leave some room for improvement. Somewhere in the neighborhood of 30% of ACL reconstruction patients do not return to vigorous activities such as soccer and football.^{2,3} More disconcerting, some 18.9% of patients enrolled in the Multicenter Orthopaedic Outcomes Network (MOON) study underwent additional knee procedures by 6 years’ follow-up.⁴ In addition, the

long-term function of the knee suffers as ACL tears clearly place patients at increased risk of osteoarthritis. Although surgery reduces this osteoarthritis risk, it does not eliminate it.⁵

Given these demonstrable limitations of ACL reconstruction, it is laudable to look for ways to improve the results of knee instability surgery. The existence of an ALL that contributes to rotational knee stability and function offers the possibility of an operative way of decreasing this persistent morbidity we all see in our patients to some degree.

Within this context, de Lima et al.¹ sought to review all histologic, radiographic, and cadaveric investigations of the ALL since 2012. Table 1 in their article serves as an excellent reference for persons interested in the 34 various cadaveric dissections the authors review. Although the investigations did not show universal agreement, they showed a general consensus that collagen runs in an anteroinferior direction connecting the femur posterior to the lateral epicondyle and the tibia posterior to the Gerdy tubercle. Whether this connective tissue is best described as a ligament, a complex, or an extension of capsule probably lies in the eye of the beholder.

Indeed, the main limitation of this systematic review will always be the various selection biases underpinning how the studies were performed and published. The very act of undertaking a study of the tissue that one would call the “anterolateral ligament” probably

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The authors report that they have no conflicts of interest in the authorship and publication of this article. Full ICMJE author disclosure forms are available for this article online, as [supplementary material](#).

Published by Elsevier on behalf of the Arthroscopy Association of North America

0749-8063/181414/\$36.00

<https://doi.org/10.1016/j.arthro.2018.11.031>

reflects on one's opinion of such tissues, as does the fact that all of these publications had results warranting publication. It takes a very dedicated scientist to march out into the Cascade Mountains looking to prove Bigfoot does not exist and an even more dedicated one to publish his or her experience sitting in the rain finding nothing. Fortunately for orthopaedics, members of the University of Pittsburgh Orthopedic Department have provided this type of zeal and have advanced the concept of the anterolateral complex of the knee.⁶⁻⁹ Their work would generally not support the concept that the ALL is a separate structure worthy of the term "ligament." Regrettably, much of their work on the subject was not reviewed because de Lima et al.¹ limited their searches to "anterolateral ligament." They rightly acknowledged that their search could and indeed did miss studies calling the collagen in question the "lateral capsule ligament" or "anterolateral complex."

Resolving how one feels about this debate probably depends on what one considers to be the definition of "ligament" in the first place and what one thinks the role of the ALL should be in surgical reconstruction. One could reasonably be expected to create a definition of a ligament that alternately either includes or excludes the tissue that de Lima et al.¹ have described. The authors of this commentary believe it should be remembered that the very concept of a ligament is a mental construct created by the physician or anatomist to create a model to understand the complex multiplicity of collagen and tissue that is a well-functioning human joint. Just as metaphors are mental shortcuts to allow us to contemplate abstract things with familiar and concrete mental images, the label of a ligament is a shortcut of sorts to allow us to contemplate the critical anatomy that allows a knee to function. It is this functioning that is the important part that we must not lose sight of as we seek to restore the function of an injured knee. Although our anatomic studies are a starting point from which to direct our surgical procedures, we remain far short of what we need to know in how this tissue will impact the clinical results of our

surgical procedures, as we attempt to reduce the 30-some-odd percent of patients who struggle to return to sport after ACL injuries. The debate will not be resolved by anatomic studies; only well-performed, rigorous, randomized clinical studies will settle the debate. To a large extent, the easy part of this process is over; the challenging work of finding Bigfoot remains.

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